

University of Groningen

## Verisimilitude Meets Epistemic Entrenchment

Zwart, Sjoerd D.; Renardel de Lavalette, Gerard R.

*Published in:*  
Abstracts of the Karl Popper 2002 Centenary Congress

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2002

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Zwart, S. D., & Renardel de Lavalette, G. R. (2002). Verisimilitude Meets Epistemic Entrenchment. In *Abstracts of the Karl Popper 2002 Centenary Congress: (Vienna, 2002)* University of Groningen, Johann Bernoulli Institute for Mathematics and Computer Science.

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# VERISIMILITUDE MEETS EPISTEMIC ENTRENCHMENT

<p>Sjoerd D. Zwart          Department of Philosophy          University of Amsterdam          Nieuwe Doelenstraat 15          1012 CP AMSTERDAM          e-mail: s.zwart@hum.uva.nl</p>	<p>Gerard R. Renardel de Lavalette          Department of Computing Science          University of Groningen          P.O. Box 800          9700 AV GRONINGEN          e-mail: grl@cs.rug.nl</p>
--	--

## Verisimilitude

The hypothetical–deductive method lacks an explanation of scientific progress, and Popper proposed his theory of verisimilitude to fill this gap. The overall idea was to show that the critical method, i.e. proposing daring hypotheses to explain the relevant phenomena, and subsequently putting them under the severest possible scrutiny, will eventually lead to better theories. Popper’s verisimilitude definition, however, failed since it could not compare two different false theories. The non-problematic and basic clause of Popper’s definition reads  $\varphi \leq^+ \psi$  iff  $\varphi \vdash \psi \vee \tau$ , and we work with the extension of this basic clause,  $\leq_\tau^v$ , developed by the first author in [1, Ch.6]. The theory of  $\psi$ ,  $Cn(\psi)$ , is, regarding the true theory  $Cn(\tau)$ , at least as verisimilar as  $Cn(\varphi)$  iff  $\psi \leq_\tau^v \varphi$ . To answer the epistemic question of verisimilitude we turned to the theory of belief revision; and, without any premeditation, it turned out to fit very well to the refined verisimilitude definition.

## Belief revision

Eschewing any reference to the concept of truth whatsoever, belief revisionists focus on the revision  $K * \varphi$  of a deductively closed belief set  $K$  in the light of  $\varphi$ . This is simply  $Cn(K \wedge \varphi)$  if  $K \wedge \varphi$  is consistent, and otherwise  $K * \varphi := Cn(K^- \wedge \varphi)$  for some  $K^- \subseteq K$  with  $K^- \neq \neg\varphi$ . It is well known that for any  $K$ ,  $K^-$  may be defined in terms of an *epistemic entrenchment* relation  $\leq_K^e$  on  $K$ , where  $\chi \leq_K^e \psi$  mirrors the willingness of the believer to give up  $\chi$  and keep  $\psi$ , rather than give up  $\psi$  and keep  $\chi$ ; that is:  $\psi$  is *epistemically more entrenched* than  $\chi$ . E.g. let  $K := Cn(p \wedge \neg q)$ ,  $\tau := Cn(p \wedge q)$ ,  $\varphi := p \leftrightarrow q$  and  $p \leq_K^e \neg q$ , then  $K * \phi := Cn(\neg p \wedge \neg q)$  is less verisimilar than  $K$ . This revision shows that updating with *true* information may lead us *away from the truth*.

## The main result

Our main result reads as follows. If for some  $K$ , the orderings  $\leq_K^e$  and  $\leq_\tau^v$  are similar (in some natural sense) and  $\varphi$  is true (i.e.  $\tau \vdash \varphi$ ), then the new theory  $K * \varphi$  is at least as close to the true theory  $Cn(\tau)$  as the original theory  $K$ , i.e.  $K * \varphi \leq_\tau^v K$ . In other words, the mechanism of our conceptual framework guarantees that updating with true evidence results in a theory that is at least as close to the truth as the original theory, *provided* that the epistemic entrenchment relation and the verisimilitude ordering of the sentences of the old theory coincide. Thus, under the proviso mentioned, and in Popperian spirit, updating with true information will us lead closer to the truth.

## References

- [1] Sjoerd D. Zwart, *Refined Verisimilitude*. Kluwer Academic Publishers, 2001.